



Figure 1.

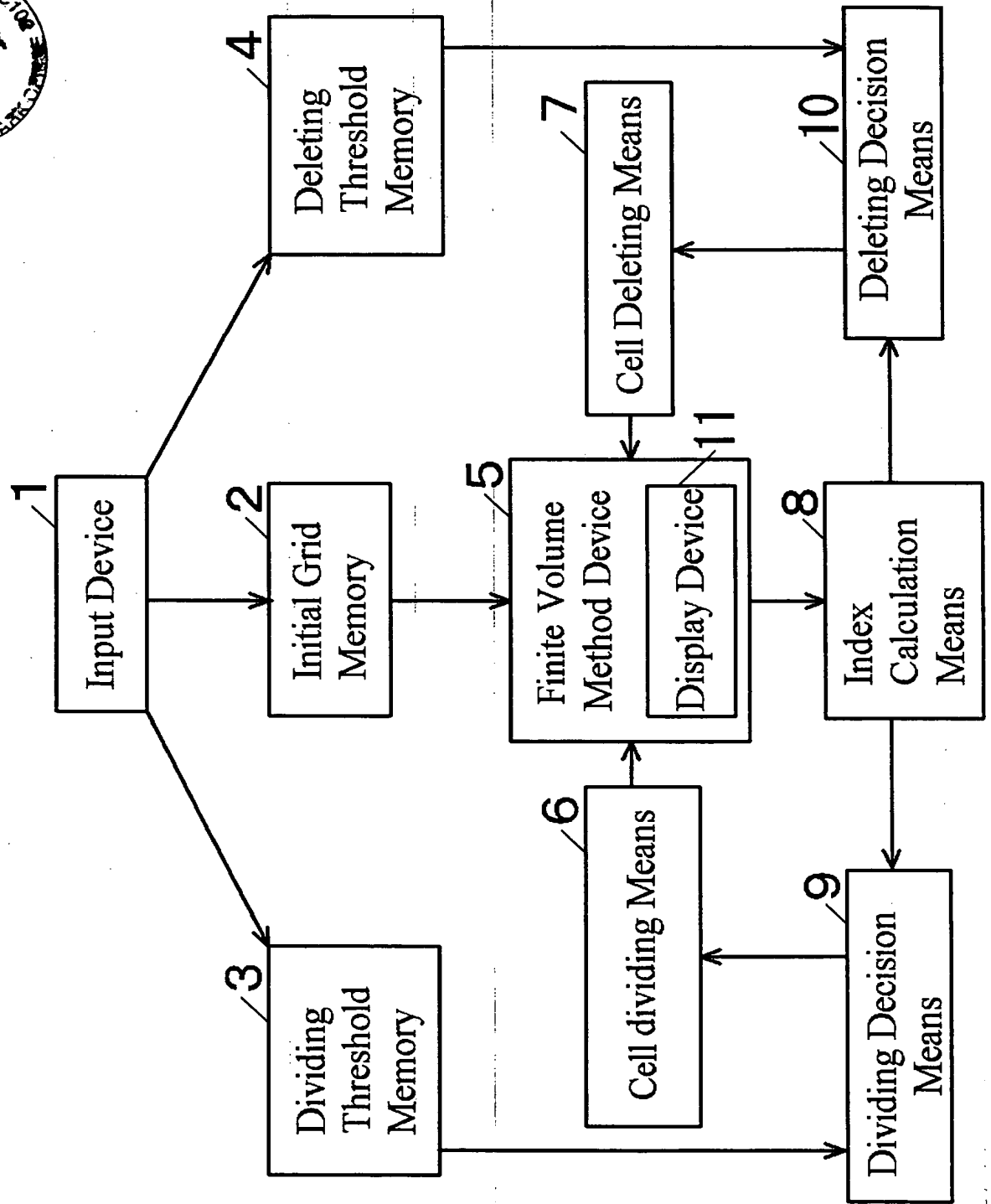


Figure 2.

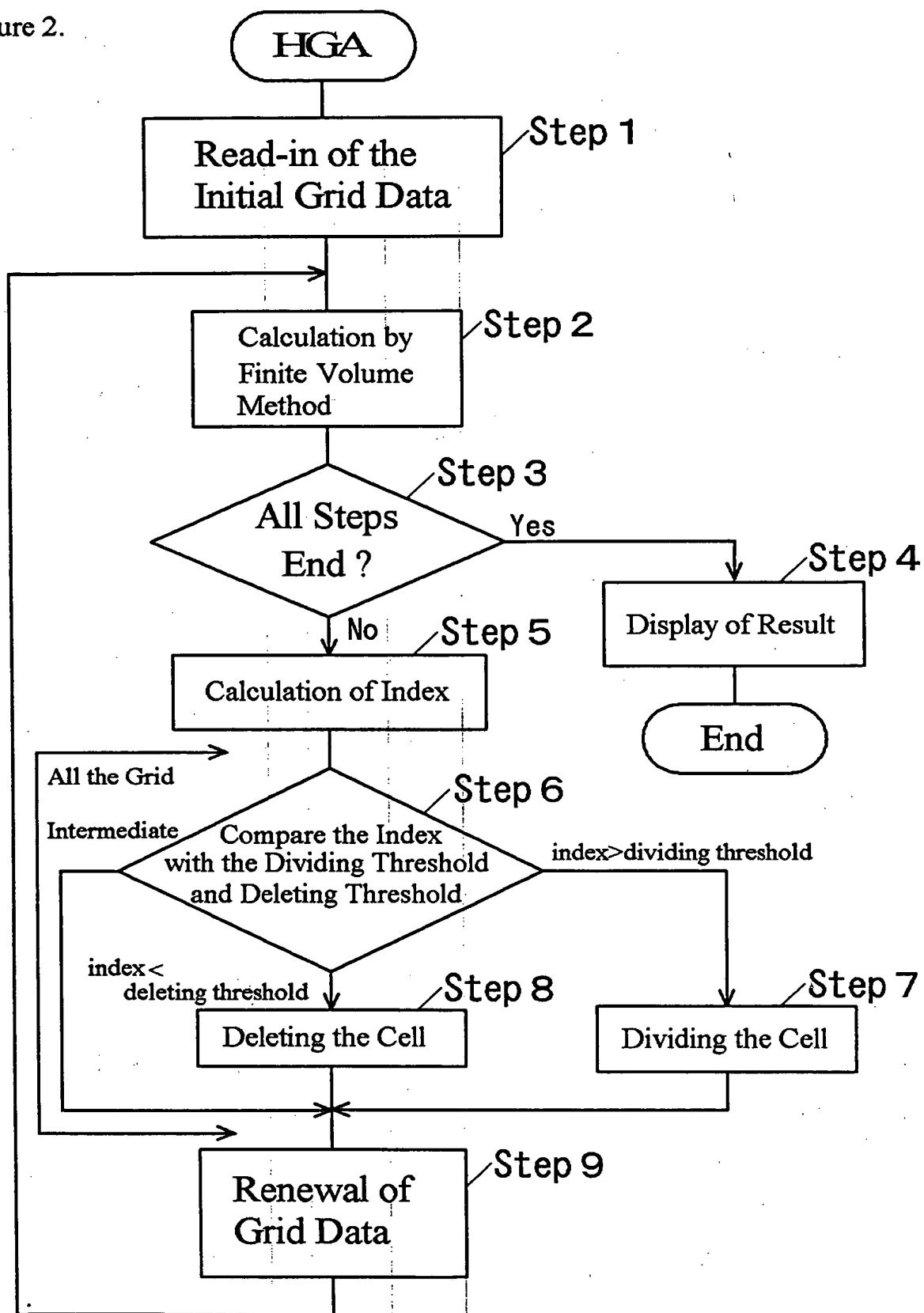
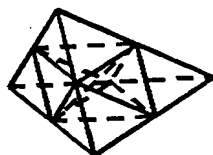
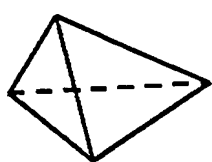
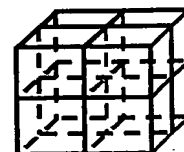
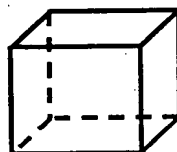


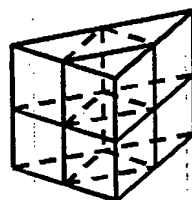
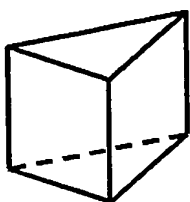
Figure 3.



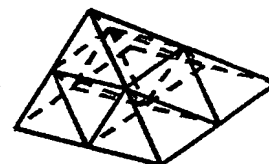
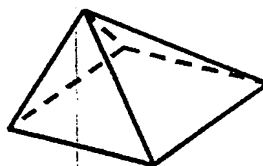
( a ) Tetrahedron:8



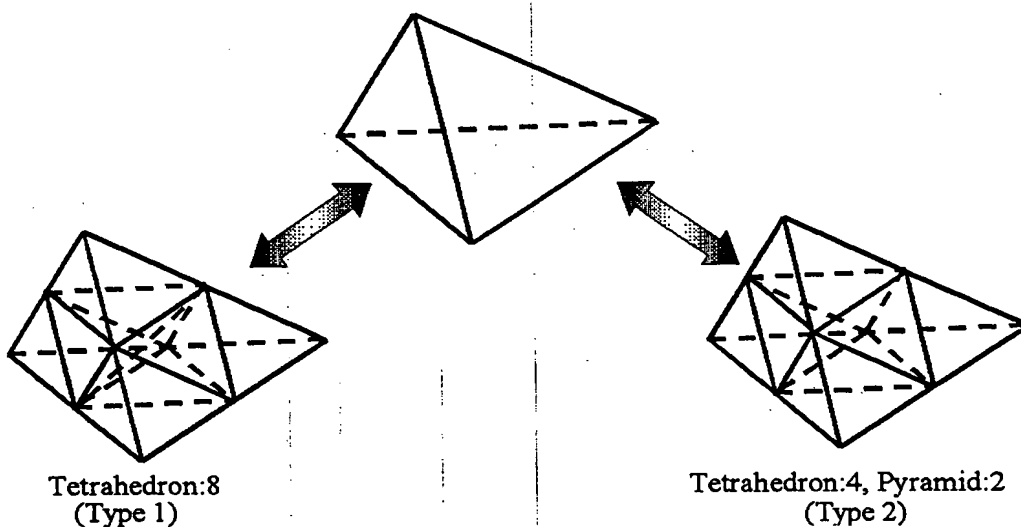
( b ) Hexahedron:8



( c ) Prism:8



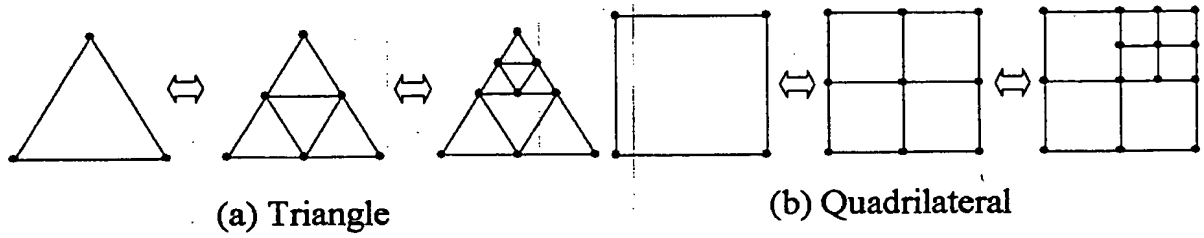
( d ) Pyramid:6, Tetrahedron:4



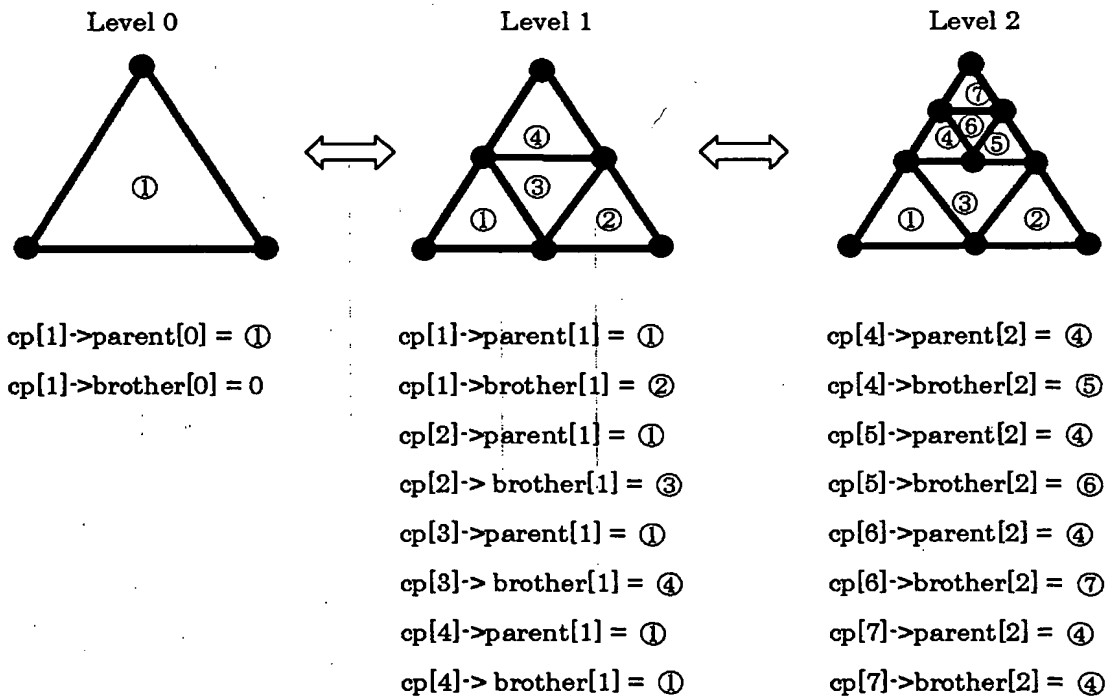
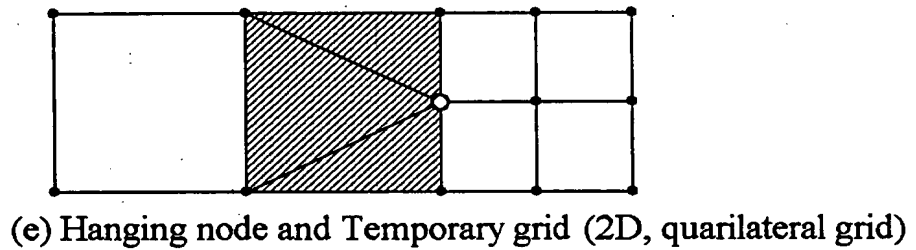
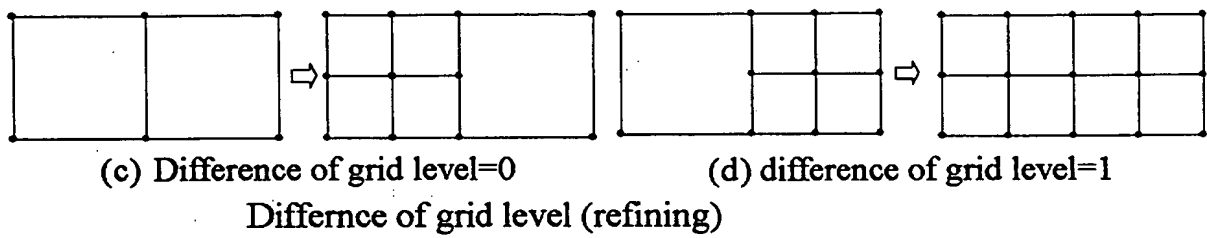
	Level 0	Level 1	Level 2	Level 3	Level 4
Tetrahedron:8 (Type 1)	1	8	64	512	4096
Tetrahedron:4 Pyramid:2 (Type 2)	1	6	44	328	2448

( e ) Division by 6 of tetrahedron

Figure 4.

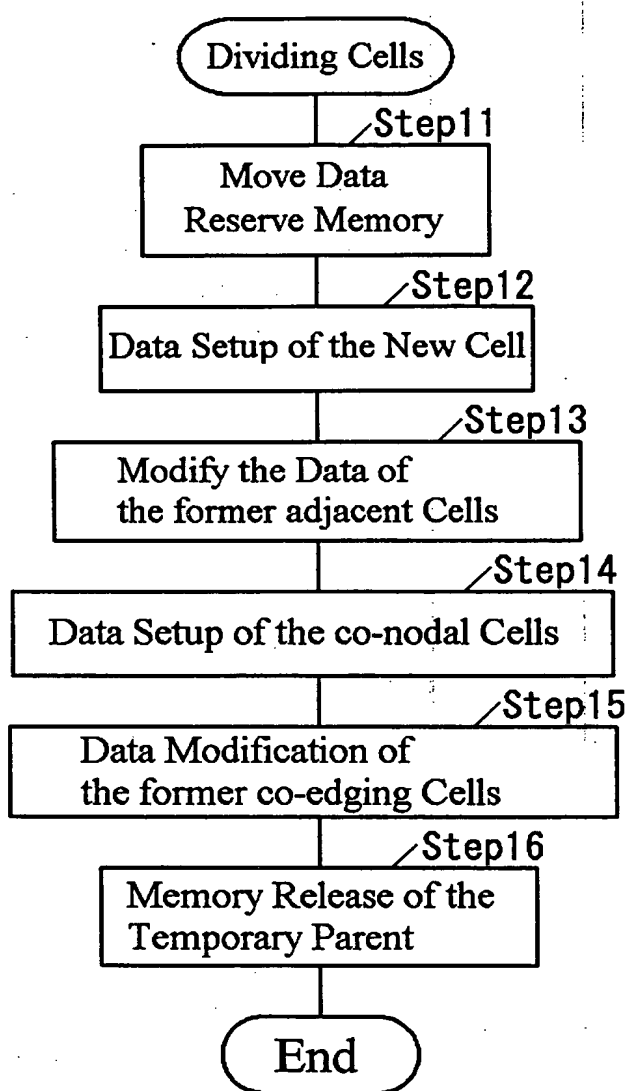


Refining and coarsening of boundary surface of grid

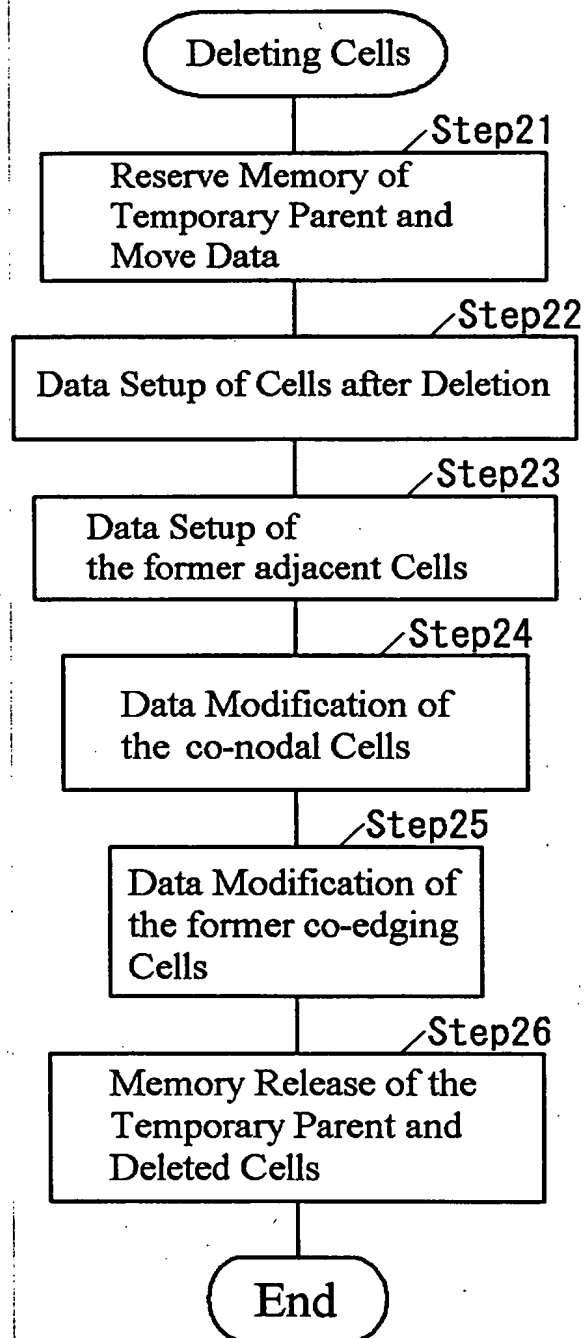


(f) Family Relation

Figure 5.

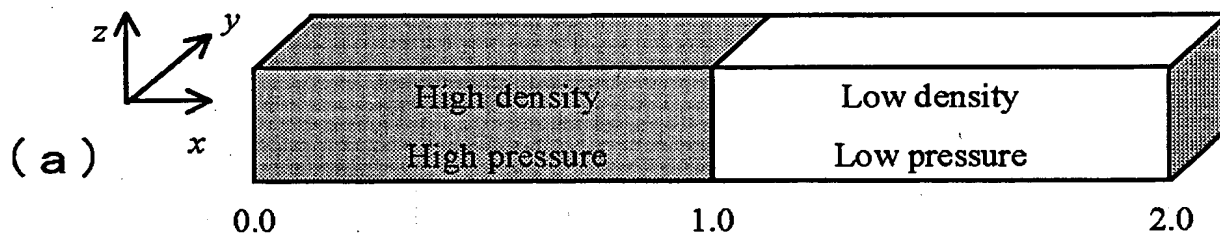


( a )



( b )

Figure 6.



Analysis domain for shock tube problem

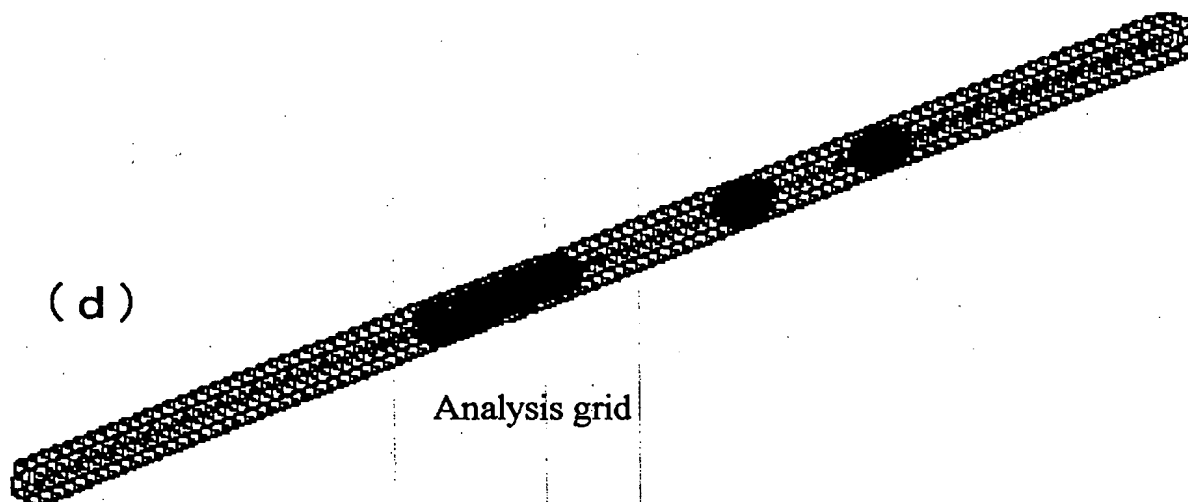
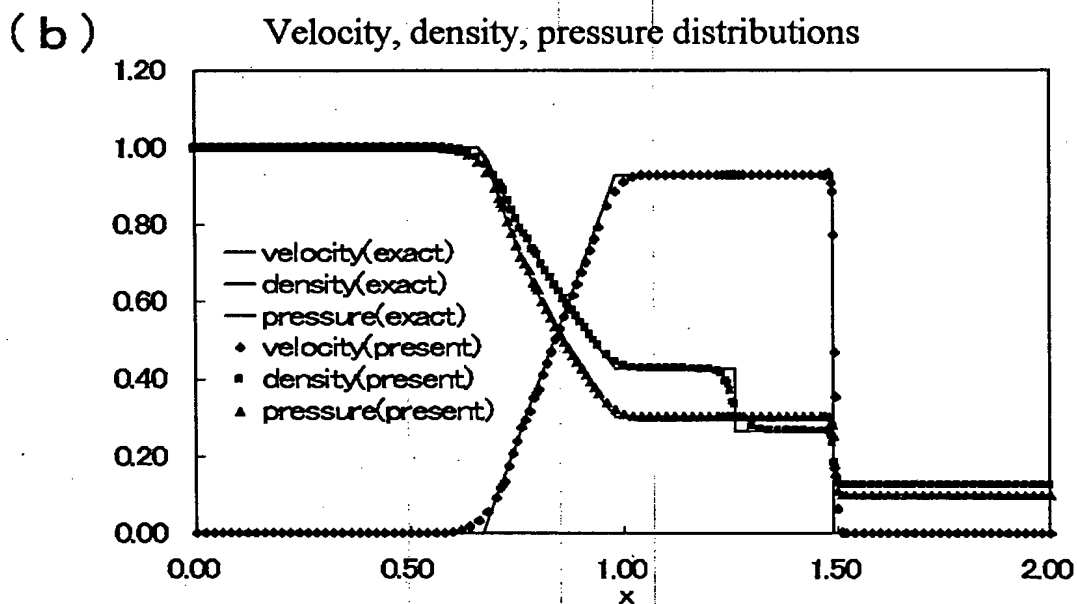


Figure 7.

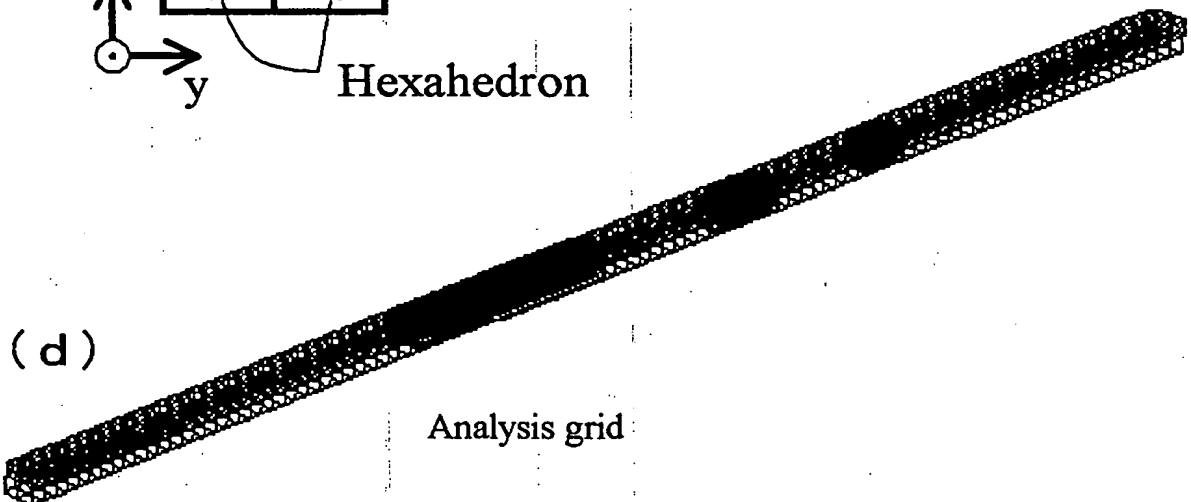
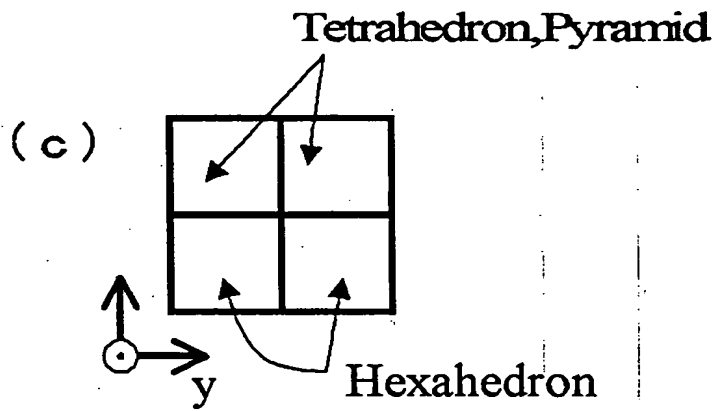
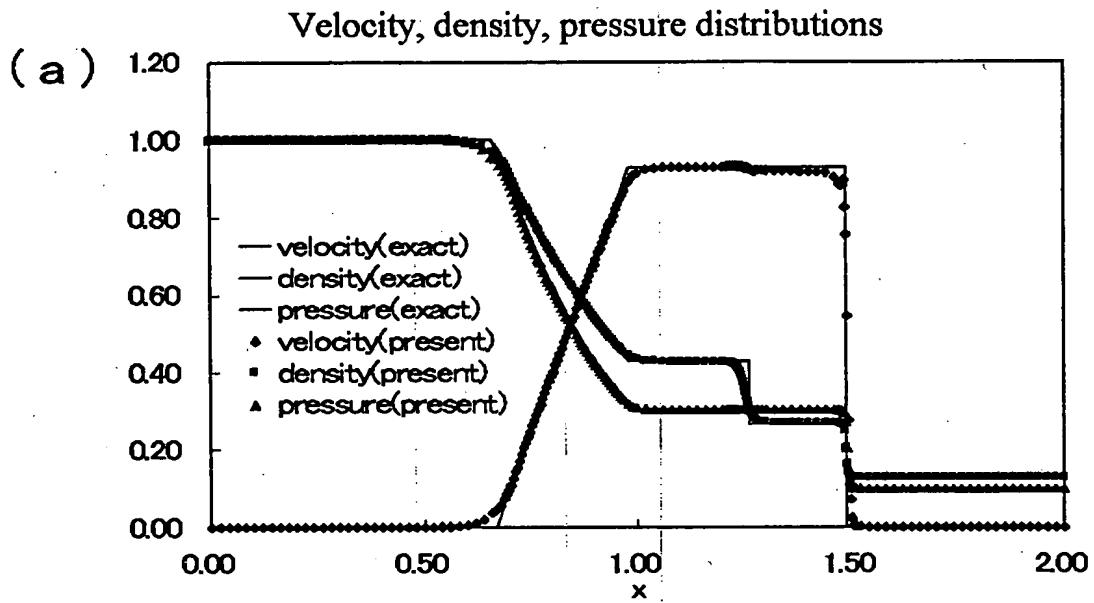
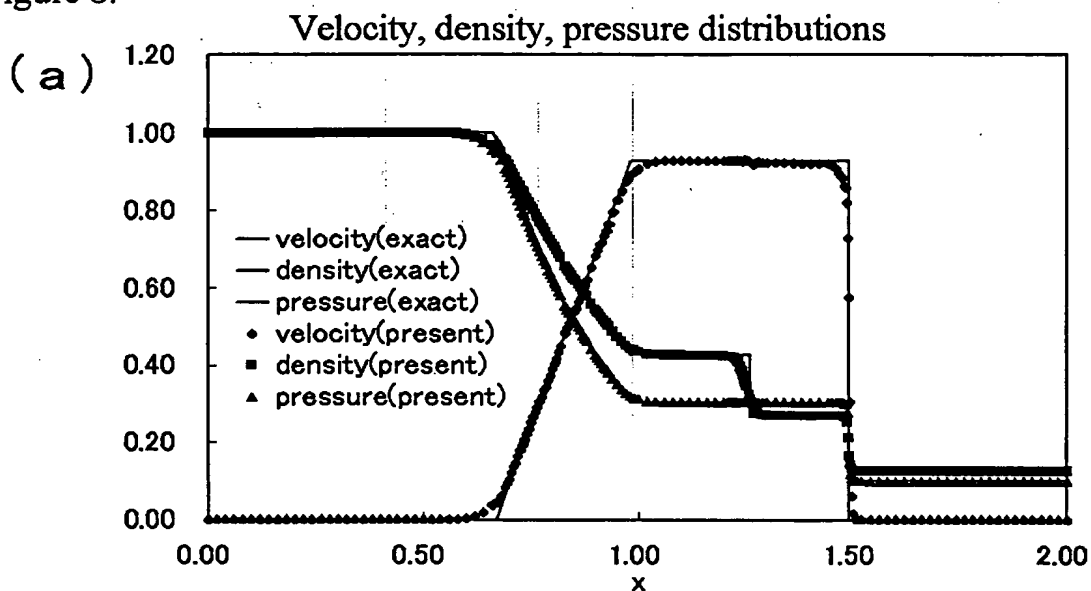
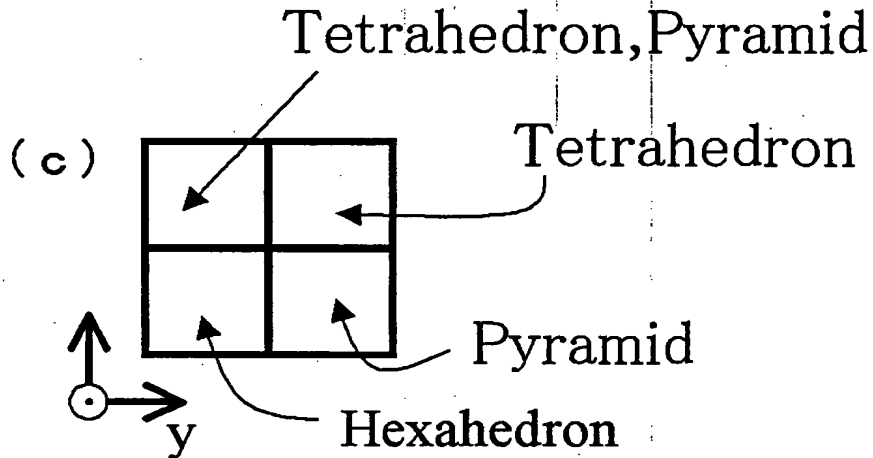
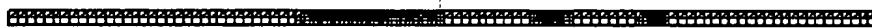


Figure 8.



(b)



(d)

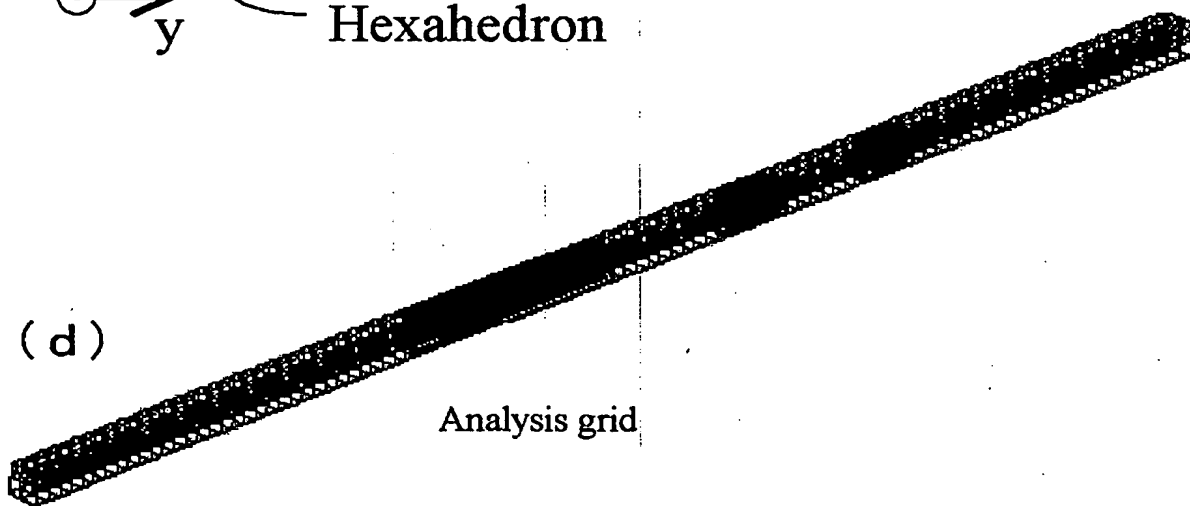
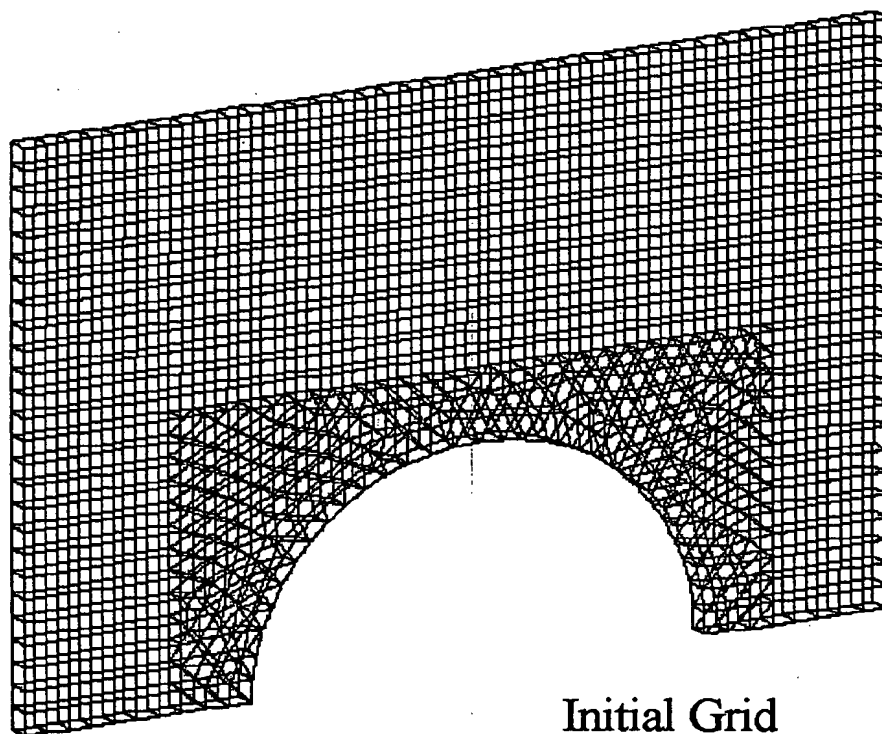




Figure 9.

(a)



(b)

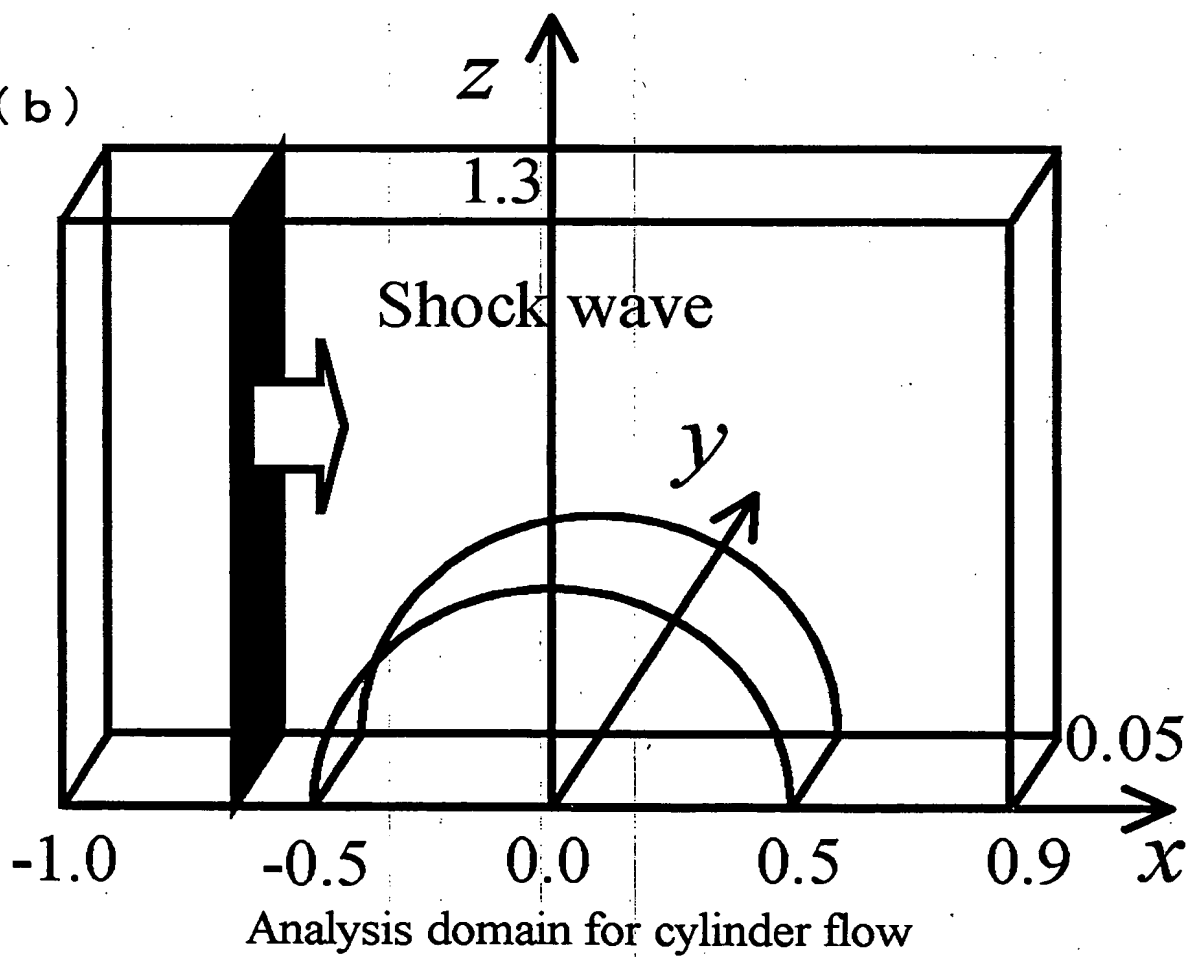
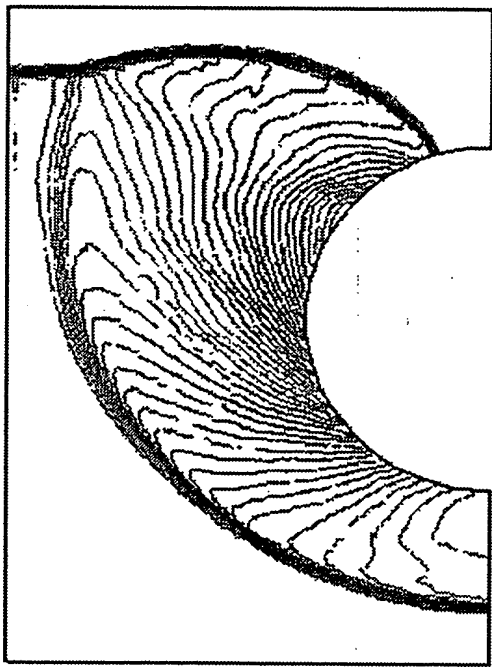
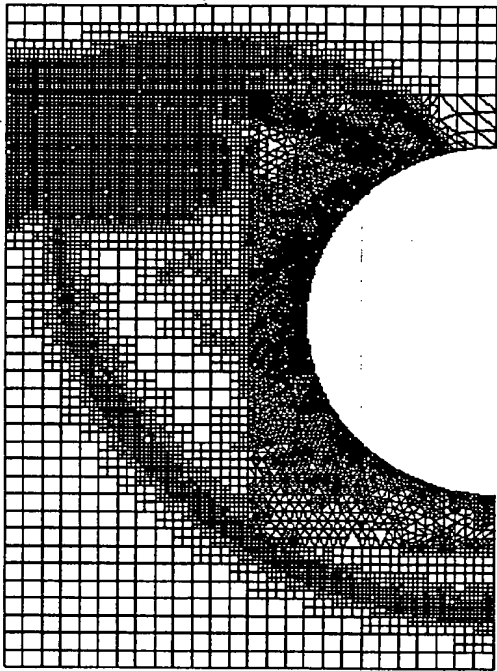


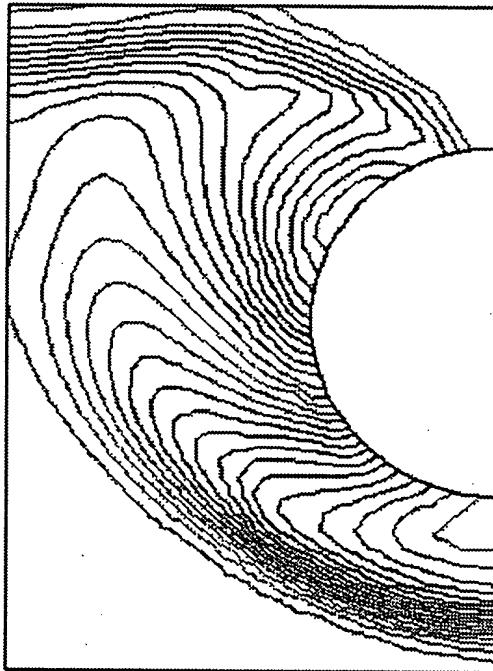
Figure 10.



( a ) Density contours



( b ) Analysis grid (117729 cells)

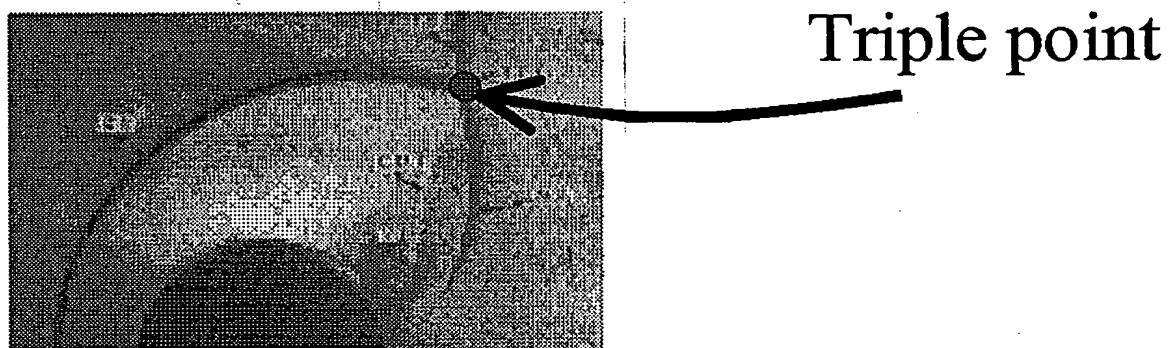


( d ) Density contours (without HGA)

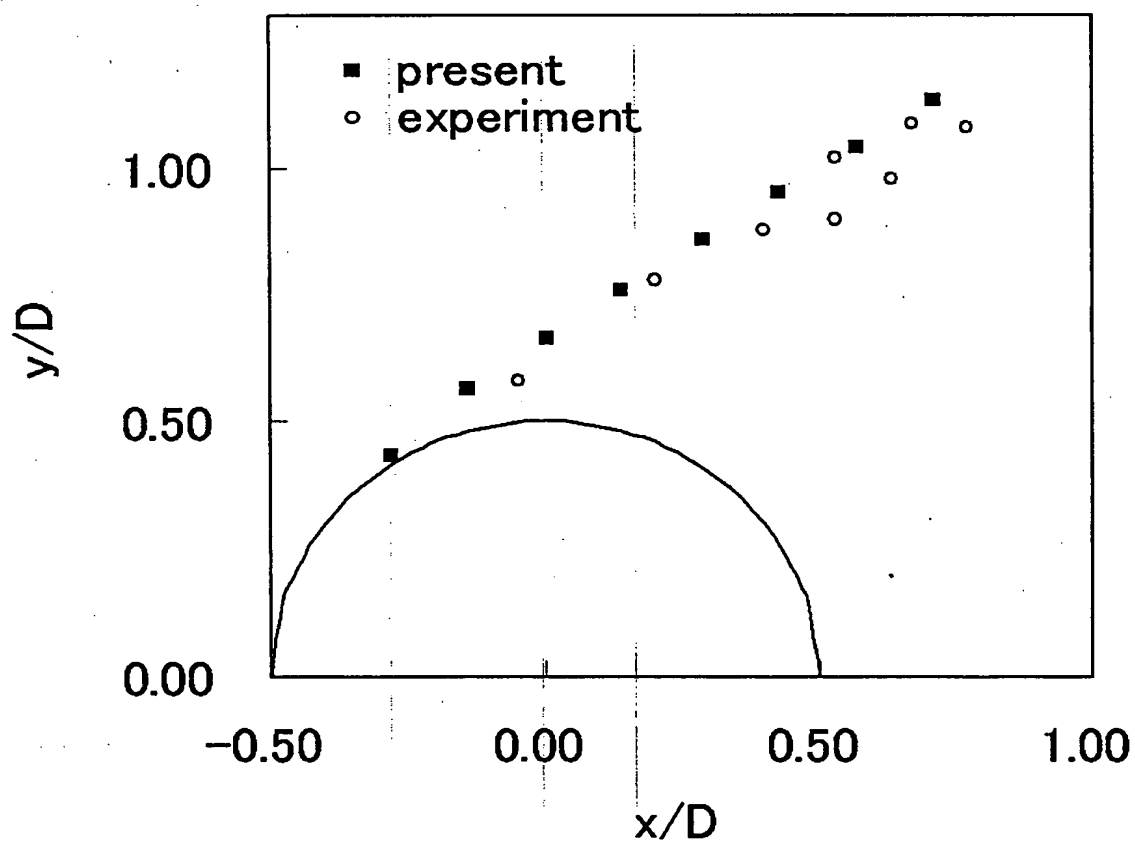


( c ) Experiment (Bryson.A.E. and Gross.R.W.F)

Figure 11.



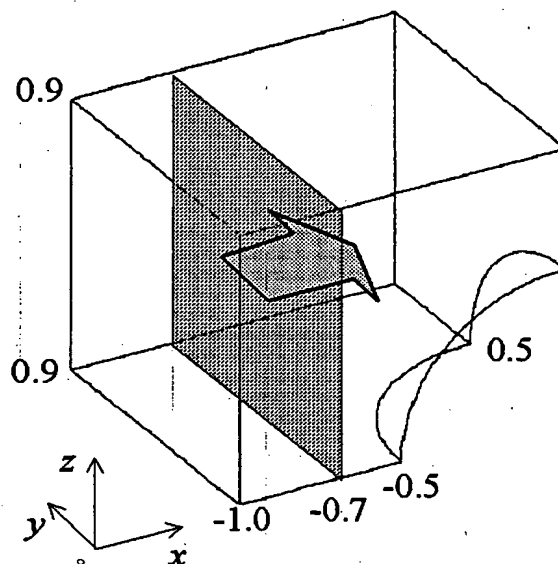
(a)



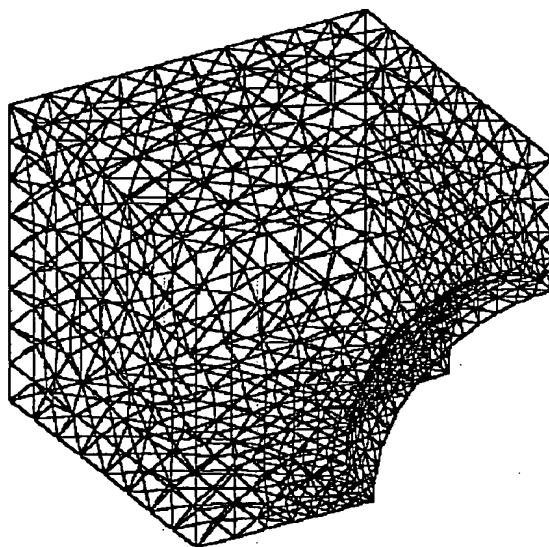
(b) Trajectories of the Mach shock triple point for cylinder flow

Figure 12.

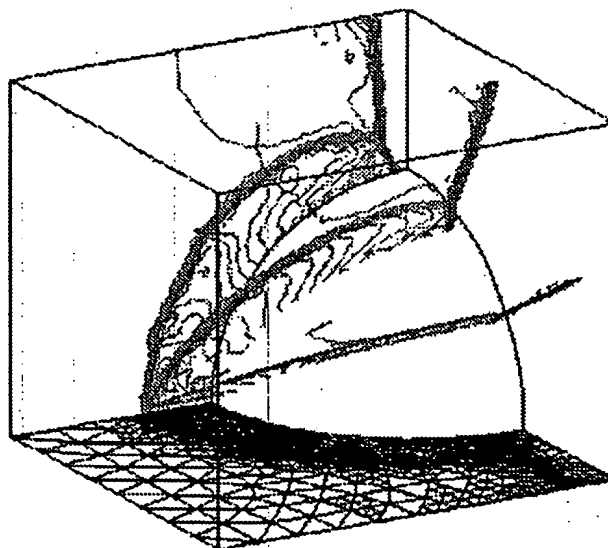
(a)  
Analysis domain  
for sphere flow



(b)  
Initial grid

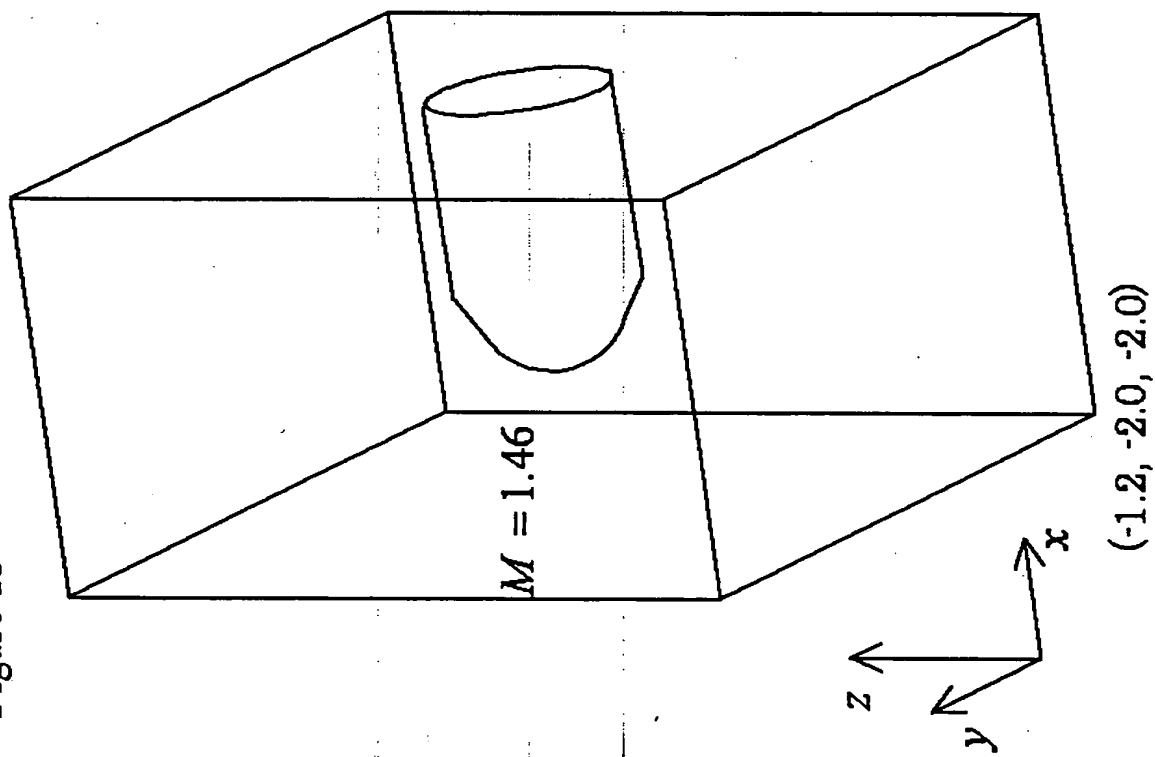


(c)  
Density contours

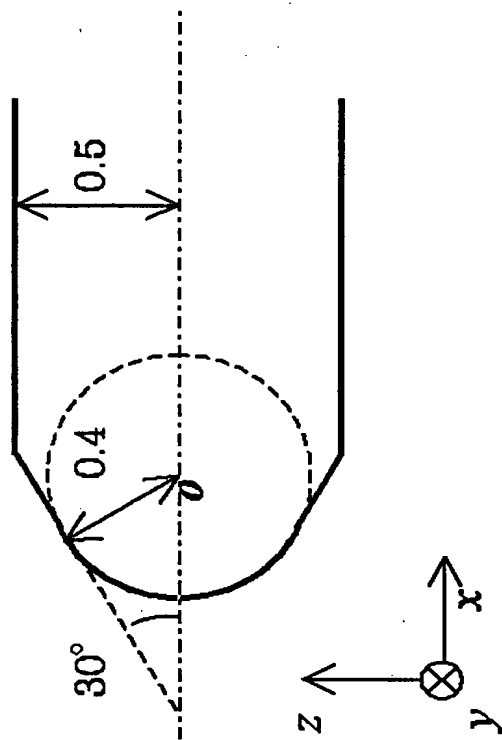


(1.2, 2.0, 2.0)

Figure 13



$$\rho = 1.4, p = 1.0, u = 1.46, v = 0, w = 0$$

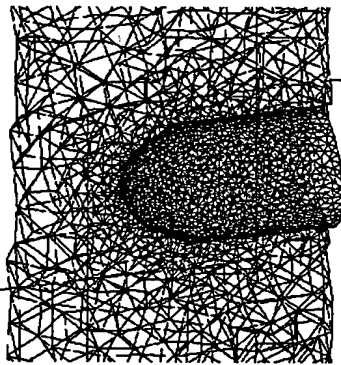
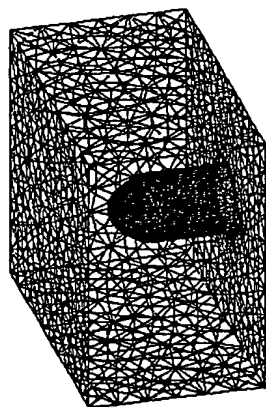


Analysis domain for Spherically blunted cone-cylinder flow

Figure 14

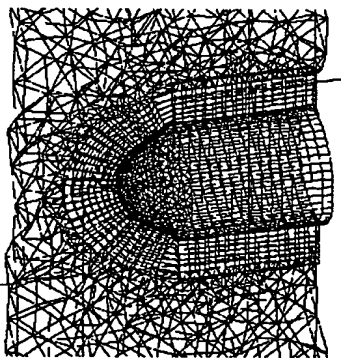
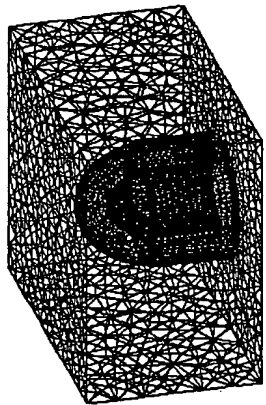
Table 1 : Analysis conditions for Spherically blunted cone-cylinder flow

	Case1	Case2
Initial grid	Tetrahedron	Hybrid
Adaptive type of Tetrahedral	Type1	Type2
Mach number	1.46	
CFL	0.5	



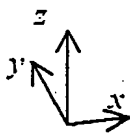
Tetrahedral grid  
38673 cells  
7687 nodes

(a) Tetrahedral grid



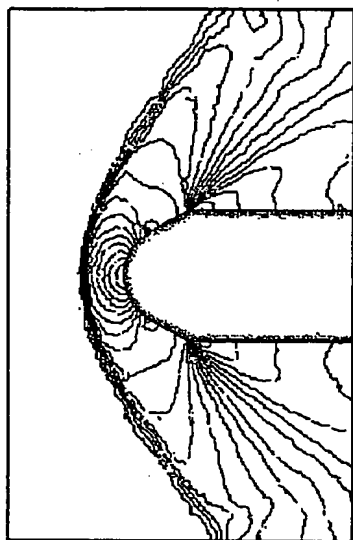
Hybrid grid  
49839 cells  
Tetrahedron: 35239  
Pyramid: 616  
Prism: 9056  
Hexahedron: 4928  
16741 nodes

(b) Hybrid grid

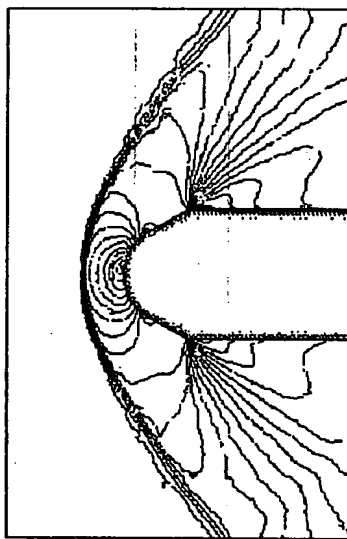


Initial grids for Spherically blunted cone-cylinder flow

Figure 15



Case 1 (Tetrahedron)

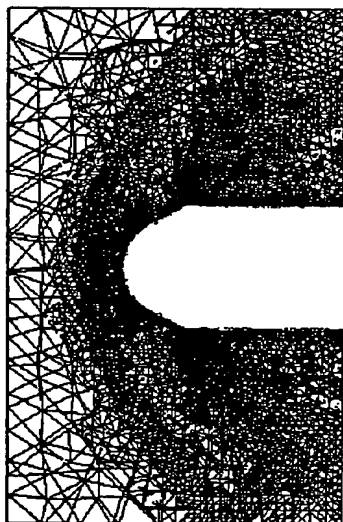


Case 2 (Hybrid)

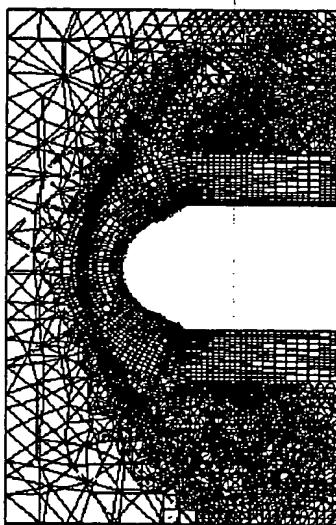


Experiment

(a) Density contours



Case 1 (Tetrahedron)



Case 2 (Hybrid)

(b) Analysis grid

Case1

1130540 cells, 264140 nodes

Case2

911419 cells, 433201 nodes

Tetrahedron: 375752

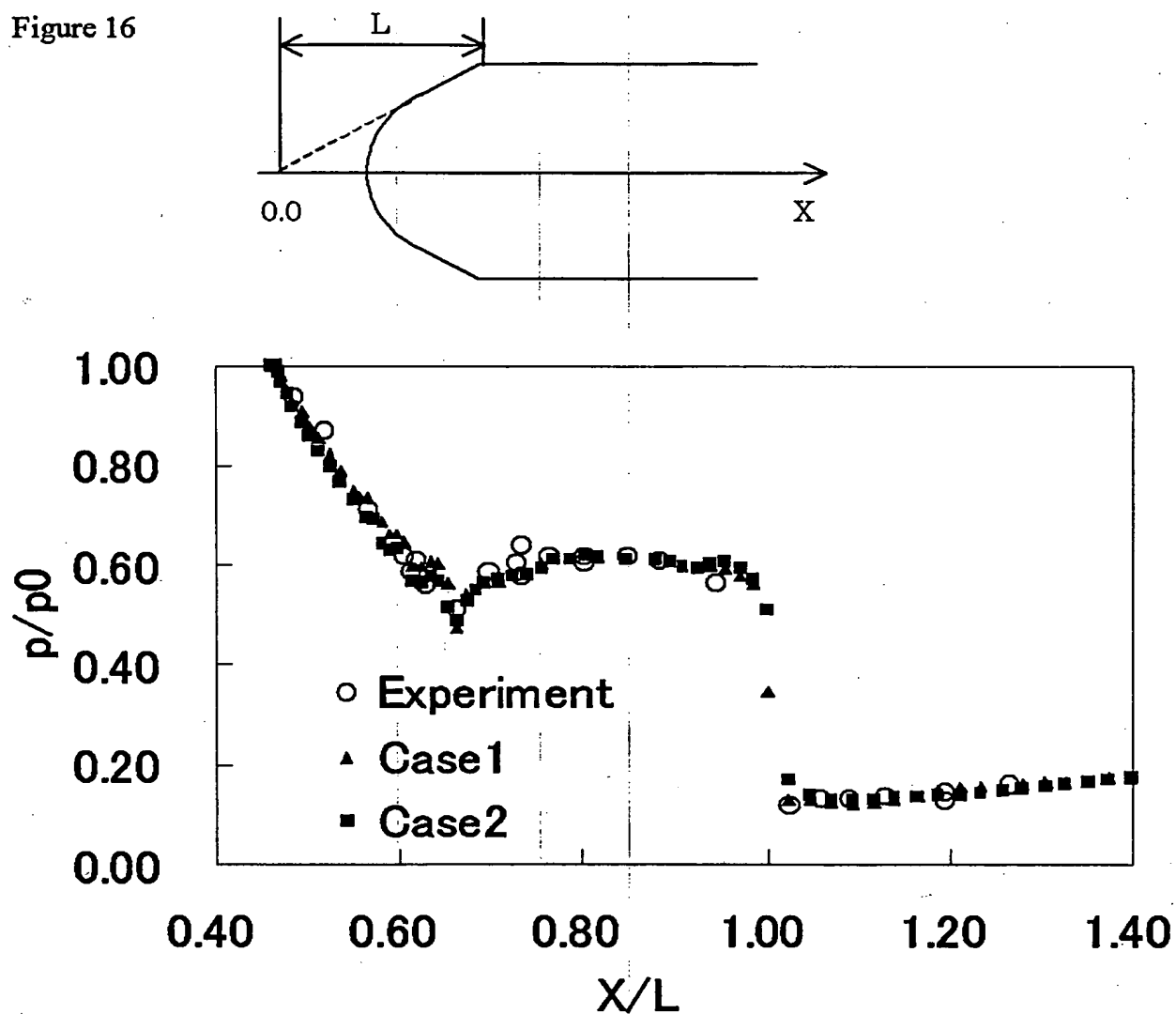
Pyramid: 294820

Prism: 178932

Hexahedron: 61915

Density contours and analysis grid ( $\gamma = 0.0$ )

Figure 16



Pressure distributions on the spherically blunted cone-cylinder

(Comparison between the present and experiment )